Records of sick, injured and dead pinnipeds in Western Australia 1980-1996

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Abstract

The management of stranded pinnipeds is often well publicized and there is strong public empathy for these animals. However, few data are available on the frequency with which sick, injured and dead pinnipeds are encountered or on the success of any applied management. This study presents what is known of stranded pinnipeds in Western Australia during the period 1980-1996. A total of 244 pinnipeds of six species were recorded sick, injured or dead during the 17 year period 1980-1996, of which 179 (73.4%) were encountered dead or died subsequently. The most commonly encountered species was *Neophoca cinerea* (110, or 61.5% of records). Of the 179 animals, 51 (28.5%) died as a result of direct or indirect interaction with humans. Twenty (39%) of the deaths caused by humans were the result of violent events directed at the pinnipeds (shot, speared, or clubbed). The species most frequently killed by human activities was *N. cinerea* (n = 47). The most common cause of unnatural death was gunshot wounds (n = 16). The most common cause of natural deaths was respiratory conditions.

Introduction

Six species of pinniped, Australian sea lion *Neophoca cinerea*, New Zealand fur seal *Arctocephalus forsteri*, subantarctic fur seal *A. tropicalis*, leopard seal *Hydrurga leptonyx*, southern elephant seal *Mirounga leonina* and crabeater seal *Lobodon carcinophagus*, have been recorded in Western Australian waters since 1980 (Table 1). The latter four species are well outside their normal Antarctic and sub-Antarctic ranges. Details of strandings of specimens of these species were subsequently archived in a Department of Conservation and Land Management (CALM) data-base. These strandings occurred on beaches along the south and lower west coast of Western Australia.

N. cinerea breeds on islands along the southern and lower western coastline of Western Australia (Gales *et al.* 1992a, 1994), while *A. forsteri* breeds on islands along the south coast of the State (Shaughnessy *et al.* 1994). The other four species of pinniped are infrequent visitors to Western Australian waters. In late 1996, two breeding records of *M. leonina* were reported (Mawson & Coughran 1999).

In Western Australia, *N. cinerea* and *A. forsteri* are afforded special protection under the provisions of the Western Australian *Wildlife Conservation Act 1950*. Neither species is considered threatened with extinction, but it is recognised that the populations of both species could decline if not afforded such protection.

Wildlife agencies have finite resources to devote to conservation of flora and fauna, but dealing with sick, injured and exhausted pinnipeds can require considerable effort and resources. Continued expenditure of resources is likely to be influenced by what has been learnt from past experiences and the likelihood of favourable outcomes from attending to sick and injured animals. This paper summarizes what has been learnt from dealing with these six species of pinniped over the period 1980-96.

Methods

Records of pinnipeds were kept during the period 1 January 1980 to 31 December 1996. Reports of pinnipeds on the Western Australian coast are routinely made to the Western Australian Department of Conservation and Land Management (CALM) and are investigated if they are unusual or to determine if intervention appears necessary. CALM staff attended strandings either to investigate the deaths of animals or to assess the animals to determine what action, if any, was required. In a small number of cases information was obtained from other government officers (*e.g.* Fisheries Officers), or from members of the public. Information presented here has been used in the development of the draft *Western Australian Pinniped Management Program 1999-2008* (Gales & Wyre 1999) and the draft *Western Australian Protocols for Handling and Treatment of Sick, Injured, Incapacitated, Transient or Dead Pinnipeds* (Gales 1999). It was also used in the preparation of the *Wildlife Conservation (Close Season for Marine Mammals) Notice 1998* (Western Australian Govt Gazette, 18/9/98 pp 5155-5157).

Details relating to each case [species, location, sex, body measurements (where possible), cause of death] were recorded in a data-base maintained by CALM. No

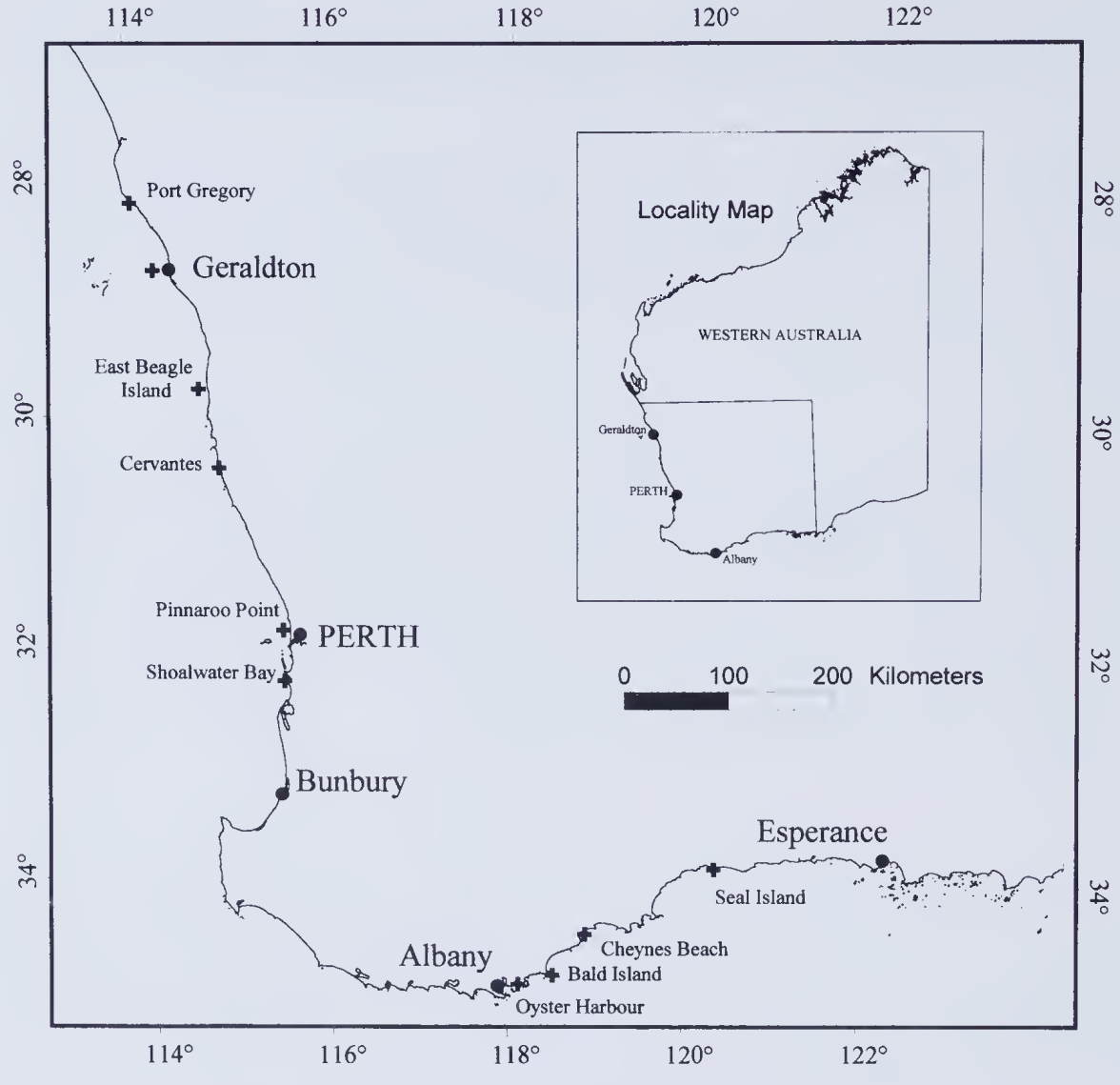

Figure 1. Map of southwest Western Australia showing the location of sites where pinnipeds have died violent deaths due to direct contact with humans (• Major towns, ✚ locations where animals were shot).

records were accepted unless the identification of the animal was verified by the data-base custodian (DKC). The data presented here do not include records of healthy animals that hauled out on beaches, and required no assistance or intervention.

Post mortems to determine the cause of death were conducted whenever possible, dependant upon access to Agriculture Western Australia veterinary staff. Many pinnipeds were too badly decomposed for post mortems. As a result of the identification of *Mycobacterium tuberculosis* in *A. forsteri* and *N. cinerea*, CALM staff now wear full protective clothing, including gloves and face mask, when handling these species.

Management of live pinnipeds in the context of this paper covered a wide range of actions, from simply excluding the public from disturbing an animal while it recuperated on a beach, through to capture and relocation to an intensive rehabilitation facility. Management of dead animals ranged from leaving the carcase *in situ* and recording relevant details, through to removal of the animal for post mortem examination and disposal or lodging it in the Western Australian Museum.

The data presented here include the records of 17 *A. tropicalis* reported by Gales *et al.* (1992b) from Western Australia (prior to 1986, *A. tropicalis* was not recognised as occurring in Western Australian waters). The data do not include those pinnipeds that died as a result of oil contamination following the sinking of the bulk ore carrier *Sanko Harvest* off the southern coast of Western Australia in February 1991. For details of that incident see Gales (1991).

Results

During the 17 years of this study, a total of 244 stranded pinnipeds were recorded, the bulk of which were *N. cinerea* (n = 150). The reporting rate varied between years and was influenced by changes in field staff, increasing knowledge and experience in species identification and a change from a centralised to a

regional reporting system within CALM. Consequently these data should not be taken to indicate any trends in encounter rates. Full details relating to the four species considered infrequent visitors to coastal waters are given in Appendix 1.

Species accounts

Australian sea lion *Neophoca cinerea*. A total of 150 sea lions (61.5% of all records) were recorded on the database (Table 1), of which 14.0% returned to the wild, 83.3% were either recovered dead or died while receiving treatment, and 2.7% for which the fate was not recorded. In the 16 years in which *N. cinerea* were encountered (no animals in 1982), 75.6% were recovered dead or subsequently died. Of the 59 *N. cinerea* for which cause of death was known, 47 (or 79.7%) died due to human interference (Tables 2, 3). Examination of the sex ratio for *N. cinerea* encountered indicates an apparent bias towards large males (81 male, 29 female, 41 unknown).

New Zealand fur-seal *Arctocephalus forsteri*. Eleven *A. forsteri* (4.5% of the total records), were recorded (Table 1), of which 27.3% returned to the wild and 72.7% were either recovered dead or died while receiving treatment. 73.7% of the fur-seals were recovered dead or died subsequently each year. Of the three *A. forsteri* for which the cause of death was known (one animal was euthanased due to old age and poor condition) two died due to tuberculosis infections, while none died due to human interference (Tables 2, 3).

Subantarctic fur-seal *Arctocephalus tropicalis*. Forty-five *A. tropicalis* (18.4% of the total records) were recorded, all since 1986 (Table 1). Of these, 37.7% returned to the wild and 62.2% were either recovered dead or died while receiving treatment. 67.1% of the fur-seals were recovered dead or died subsequently in each year. Of the seven *A. tropicalis* for which the cause of death was known, two died due to human interference (Tables 2, 3).

Leopard seal *Hydrurga leptonyx*. Twenty-seven *H. leptonyx* (11.1% of the total records) were recorded, all since 1986 (Table 1), of which 44.4% returned to the wild and 55.6% were either recovered dead or died while receiving treatment. 62.6% of the leopard seals were recovered dead or subsequently died in each year. Of the three *H. leptonyx* for which the cause of death was known, two died due to human interference (Tables 2, 3).

Southern elephant seal *Mirounga leonina*. Eight *M. leonina* (3.3% of total records) were recorded, all since 1990 (Table 1), of which 87.5% returned to the wild and 12.5% were either recovered dead or died while under observation. In the four individual years in which *M. leonina* were encountered, none of the seals required veterinary intervention and none died due to human interference (Tables 2, 3). The one death recorded was that of a newborn pup (see Mawson & Coughran 1999).

Crabeater seal *Lobodon carcinophagus*. Three *L. carcinopahgus* (1.2% of the total records) were recorded, all since 1982 (Table 1), of which 33.3% returned to the wild and 66.7% were either recovered dead or died while receiving treatment. In the two individual years in which *L. carcinophagus* were encountered, 75.0% of the seals were recovered dead or subsequently died. None of the deaths could be attributed to human interference. The cause of death for one animal was known (Table 3) and the other animal died in captivity while receiving treatment, but the precise cause of death was not determined.

In summary, a total of 179 animals (73.4% of the total records) were encountered dead, or subsequently died. Of those 179 animals, 51 (28.5%) were found to have died as a direct or indirect result of interaction with humans.

Table 1

Numbers of each species of pinniped encountered by CALM staff 1980-1996 in Western Australia. Values in parentheses indicate the number of seals returned to wild, the number which died, and the number for which fate is unknown).

Year	*Neophoca cinerea*	*Arctocephalus forsteri*	*Arctocephalus tropicalis*	*Hydrurga leptonyx*	*Mirounga leonina*	*Lobodon carcinophagus*	Total
1980	8 (1,6,1)	1 (0,1,0)	0	0	0	0	9 (1,7,1)
1981	1 (1,0,0)	0	0	0	0	0	1 (1,0,0)
1982	0	0	0	0	0	1 (0,1,0)	1 (0,1,0)
1983	3 (1,2,0)	0	0	0	0	0	3 (1,2,0)
1984	2 (0,2,0)	0	0	0	0	0	2 (0,2,0)
1985	5 (2,3,0)	0	0	0	0	0	5 (2,3,0)
1986	8 (6,2,0)	0	1 (1,0,0)	6 (1,5,0)	0	0	15 (8,7,0)
1987	6 (2,4,0)	0	3 (1,2,0)	1 (0,1,0)	0	0	10 (3,7,0)
1988	19 (2,17,0)	1 (0,1,0)	4 (1,3,0)	1 (1,0,0)	0	0	25 (4,21,0)
1989	23 (3,20,0)	0	3 (1,2,0)	0	0	0	26 (4,22,0)
1990	19 (0,19,0)	3 (1,2,0)	1 (0,1,0)	8 (6,2,0)	1 (1,0,0)	0	32 (8,24,0)
1991	14 (1,12,1)	0	1 (0,1,0)	0	1 (1,0,0)	0	16 (2,13,1)
1992	8 (0,8,0)	2 (1,1,0)	11 (1,10,0)	5 (2,3,0)	0	0	26 (4,22,0)
1993	14 (2,11,1)	2 (0,2,0)	6 (4, 2,0)	1 (0,1,0)	0	2 (1,1,0)	25 (7,17,1)
1994	6 (0,5,1)	1 (1,0,0)	6 (3,3,0)	0	0	0	13 (4,8,1)
1995	8 (0,8,0)	1 (0,1,0)	4 (2,2,0)	2 (0,2,0)	1 (1,0,0)	0	16 (3,13,0)
1996	6 (0,6,0)	0	5 (3,2,0)	3 (2,1,0)	5 (4,1,0)	0	19 (9,10,0)
Total	150 (21,125,4)	11 (3,8,0)	45 (17,28,0)	27 (12,15,0)	8 (7,1,0)	3 (1,2,0)	244 (61,179,4)

Table 2

Causes of death of pinnipeds in Western Australia involving human influences. (n = 47 *N.cinerea*, n = 2 *A. tropicalis*[a] and n = 2 *H. leptonyx*[b], one in each year for both *A. tropicalis* and *H. leptonyx*).

Cause	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	Total
Shot	7	0	0	1	1	0	2[b]	1	0	1	1	1	0	1	0	0	0	16
Boat Propeller	0	0	0	0	1	1	0	0	2	0	1	1	0	1	0	0	1	8
Lobster Pots/lines	0	0	0	0	0	0	1	0	1	2	1	0	2	0	0	0	0	7
Fishing lines/hooks	2	0	0	0	0	0	2[b]	0	0	0	0	0	0	3	0	0	0	7
Fishing nets	0	0	0	0	0	0	0	0	3	1	0	0	1[a]	2[a]	0	0	0	7
Speared	1	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	3
Plastic bands	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	2
Clubbed	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
Total	10	0	0	2	2	1	6	1	7	4	3	2	3	8	1	0	1	51

Table 3

Natural causes of death (where known) of pinnipeds in Western Australia.

Cause	*N. cinerea*	*A. forsteri*	*A. tropicalis*	*H. leptonyx*	*L. carcinophagus*	Total
Pneumonia	3	0	1	0	0	4
Pleurisy	2	0	0	0	0	2
Bronchitis	1	0	0	0	0	1
Mycobacterium tuberculosis	2	2	0	0	0	4
Histiocytic tumor	2	0	0	0	0	2
Septicaemia	1	0	0	0	0	1
Toxaemia	0	0	0	0	1	1
Gastro-enteritis	0	0	1	0	0	1
Cestodes/nematodes	0	0	3	0	0	3
Abscess	1	0	0	0	0	1
Immune system failure	0	0	0	1	0	1
Total	12	2	5	1	1	21

Unnatural causes of death

The causes of death could be grouped into eight categories for unnatural deaths (Table 2) and 11 categories for natural deaths (Table 3). The species most frequently affected by human activities was *N. cinerea* (n = 47, 65.3% of deaths for which cause was determined); in addition there were two records each for *A. tropicalis* and *H. leptonyx*. The most common cause of unnatural death was shooting (n = 16, 31.4% of the unnatural deaths), including a shooting of six animals on one occasion in 1980.

The next most common causes of death in decreasing order of occurrence were; boat collisions (n = 8, 15.7%), juvenile animals drowning in lobster pots or attached ropes (n = 7, 13.7%), entanglement in fishing line/hooks (n = 7, 13.7%), drowning in fish nets (n = 7, 13.7%), speared or shot with arrows (n = 3, 5.9%), choked by plastic bait bands/straps (n = 2, 3.9%), and clubbed to death (n = 1, 1.9%).

For the 16 animals which were shot (15 *N. cinerea*, 1 *H. leptonyx*), all shootings were likely to have occurred in areas with either active fishing fleets or major human populations (Fig 1); note that the site of shooting might not necessarily be the same as the location where the injured/dead animal comes ashore. Ten seals were shot in the Albany area (6 recovered at Bald Island, 2 at Oyster Harbour, 1 at Cheynes Beach, and 1 at Seal Island near Hopetoun). Four animals were shot along the mid-west coast area from Port Gregory south to Cervantes (1 recovered at Port Gregory, 1 at Geraldton, 1 at East Beagle Island, and 1 at Cervantes). Two shootings occurred along the Perth metropolitan coast (1 animal recovered at Pinnaroo Point, and 1 at Shoalwater Bay). The shooting at Pinnaroo Point, near Yanchep, involved the *H. leptonyx*, and one *N. cinerea* was killed with an arrow at Shoalwater Bay (included in the 'Speared' category in Table 2).

Natural causes of death

Post mortems identified the principal cause of death in 21 cases (12 *N. cinerea*, 2 *A. forsteri*, 5 *A. tropicalis*, 1 *H. leptonyx* and 1 *L. carcinophagus*). A wide range of causes was identified (Table 3), with respiratory conditions being the most common group. Four cases of tuberculosis (*Mycobacterium tuberculosis*) were recorded, with two records each from *N. cinerea* and *A. forsteri* (Cousins *et al.* 1993).

Discussion

The data presented here indicate that a high percentage (51 of 179, or 28.5%) of the pinnipeds found dead or moribund on Western Australian beaches have been adversely affected by humans in some way. Thirty-nine percent (20 of 51) of animals that died from interactions with humans, suffered violent deaths (16 shot, 3 speared and 1 clubbed) and a further 16% died as a result of injuries sustained from collisions with small boats (total 55%). These figures are likely to be underestimates, given that many carcases were too decomposed to determine the cause of death.

The number of animals that die from collisions with boats can be expected to increase as recreational boating activity increases along the west and south coast of Western Australia, particularly where such activities occur in close proximity to haul-out sites or breeding islands. If the populations of sea lions and fur seals continues to increase, then the numbers killed in collisions with boats is also likely to increase. There is scope for public education programs to advise boat owners how to interact with pinnipeds. There may also be a need to legislate to restrict the close approach of small boats to haul-out sites and breeding colonies. The development of standard guide-lines similar to those adopted for interactions with cetaceans should enable humans to interact with pinnipeds without having an adverse impact on their populations.

The estimated population of *N. cinerea* in Western Australia is 2600-3400 (Gales *et al.* 1994) while that of *A. forsteri* is 7000 (Shaughnessy *et al.* 1994). Despite the greater numbers of *A. forsteri* along the Western Australian coastline, *N. cinerea* suffered more from adverse interactions with humans. The population of *N. cinerea* along the west coast is slightly smaller than that occurring along the south coast but suffered a greater number of deaths. This was most probably due to the fact that prime sea lion habitat on the west coast occurs closer to the main human population centres where boating and fishing activities are more common. Male *N. cinerea* were encountered nearly three times as often as females, and males died violent deaths twice as often as females. This is most likely a reflection of the dispersal and foraging behaviour of males and proximity of several major haul-out sites close to large cities and towns and to commercial fishing zones (Gales *et al.* 1992a). Females are rarely seen at these sites.

Success in reducing the incidence of violent death amongst pinnipeds will depend partly on the co-operation of the public in reporting these illegal activities, the judicial system applying appropriate penalties, and on education programs to raise public awareness of how to report stranded animals and to safely interact with pinnipeds.

Thirty-five of 41 (85%) *A. tropicalis* encountered were significantly underweight. This suggests that these animals were not foraging successfully and these records may represent extra-limital movements.

Eight *H. leptonyx* died while in care, several while under anaesthesia, four were euthanased due to their poor condition, and only one was released back to the wild. This species is large, strong and can be particularly aggressive even when ill. Given the difficulties encountered so far in treating this species, continued capture and attempts at rehabilitation seem unwise.

The establishment and maintenance of a data-base such as the one used by CALM provides a valuable means of storing data on species of pinniped which seldom visit mainland Australia (*e.g. H. leptonyx, M. leonina,* and *L. carcinophagus*). Post mortem examinations and pathology also give an insight into the natural diseases from which these species suffer. Such information can be important in interpreting significant or sudden changes in wild populations.

Recent events elsewhere in Australia have shown that diseases in native wildlife can have significant implications for their management *e.g.* morbillivirus in pinnipeds (Mahy *et al.* 1988) and cetaceans, lyssavirus in megachiropterans, and viral chorio-retinitis in large *Macropus* sp. The discovery of diseases such as *M. tuberculosis* in pinnipeds also has significant occupational welfare implications for those people handling infected animals (live or dead).

The question of value-for-money in dealing with pinniped strandings is difficult to resolve. It is fairly easy to quantify the cost of managing sick or injured pinnipeds (veterinary costs, post mortems, carcase disposal, travel expenses), but it is difficult to determine the value of the information gained, particularly from species rarely encountered in Australian waters which might not otherwise be studied. Neither is it easy to quantify the value of the positive public relations which can be obtained through caring for (and in some cases releasing) pinnipeds. Public perception of Australian native fauna is largely limited to a few well-known terrestrial species (*e.g.* kangaroos and koalas). In a State with such a large coastline and many population centres located along the coastline, limited active management and passive data collection provides an opportunity to raise public awareness of conservation issues associated with a little appreciated group of our native fauna.

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Appendix 1

Summary of accounts for individual animals for the four species of non-resident pinnipeds encountered in Western Australia 1980-96. Note: data for *A. tropicalis* follow on from those presented by Gales *et al.* (1992b).

	Date	Sighting/Collection Site	Sex	History
Leopard seal *Hydrurga leptonyx*				
1	14/10/83	Peppermint Beach 33°32'S, 115°29'E	?	Returned to the sea.
2	27/07/86	Pinnaroo Point 31°49'S, 115°44'E	M	Head wound caused by gun shot, died in captivity.
3	1/09/86	Bunbury 33°19'S, 115°38'E	?	Wounds to mouth and underside, died in captivity.
4	6/09/86	Geographe Bay 33°37'S, 115°08'E	?	Poor condition, lacerations to throat and flippers from shark attack, died in captivity after some years.
5	17/10/86	Denmark 34°57'S, 117°21'E	?	Died in captivity.
6	17/11/86	Florida Beach 32°38'S, 115°37'E	M	Poor condition, internal injury caused by fishing hooks, died in captivity.
7	24/10/87	Smiths Beach 33°39'S, 115°02'E	F	Deep wounds to head and neck, bone infection. Euthanased.
8	10/09/88	Two Rocks 31°30'S, 115°35'E	F	Dehydrated, poor body condition. Rehabilitated and released 4/11/88.
9	16/06/90	Cape Le Grand 34°01'S, 122°07'E	?	Rested before returning to sea.
10	27/08/90	Denmark 34°55'S, 117°32'E	?	Rested before returning to sea.
11	1/09/90	Salmon Holes, Tornidirrup 35°07'S, 117°55'E	?	Found dead.
12	1/09/90	Salmon Holes, Tornidirrup 35°07'S, 117°55'E	?	Swimming off shore.
13	8/09/90	Lancelin 31°01'S, 115°20'E	?	Rested before returning to sea.
14	11/09/90	Four Mile Beach, Esperance 33°52'S, 121°53'E	?	Wounds from shark attack, recovered after resting and returned to sea.
15	2/10/90	Walpole 34°59'S, 116°44'E	?	Found dead.
16	11/10/90	Free Beach 33°51'S, 121°55'E	?	Wound to head – returned to the sea.
17	21/08/92	Seabird 31°16'S, 115°26'E	?	Hauled out to rest but returned to the sea after harassment by people.
18	22/08/92	Esperance 33°52'S, 121°53'E	F	Hauled out, infected left eye – bite injury. Died under anaesthetic.
19	25/08/92	San Remo 32°29'S, 115°45'E	?	Found dead.
20	17/09/92	Cowaramup (Gracetown) 33°52'S, 114°58'E	?	Found exhausted, rested then returned to sea.
21	6/11/92	Thirsty Point – Cervantes 30°30'S, 115°04'E	M	Weak and emaciated, died 7/11/92.
22	22/10/93	Geraldton 28°46'S, 114°37'E	M	Poor body condition, weak and lethargic. Euthanased.
23	1/09/95	Princess Royal Harbour, Albany 35°04'S, 117°53'E	F	Found in poor condition, severely emaciated, laboured breathing. Euthanased.
24	4/09/95	Mutton Bird Beach, Torbay 35°04'S, 117°44'E	M	Found in an emaciated state and non-responsive. Euthanased.
25	4/08/96	Two Peoples Bay 34°57'S, 118°11'E	?	Rested on beach till 5/8/96, then returned to sea.

Appendix 1 (continued)

	Date	Sighting/Collection Site	Sex	History
26	13/08/96	Cottesloe 31°59'S, 115°45'E	M	Died 7/09/96 while receiving intensive treatment.
27	12/09/96	Ten Mile Beach, Esperance 33°51'S, 121°55'E	M	Rested on beach, returned to sea 15/09/96.
Elephant seal *Mirounga leonina*				
1	10/07/90	Cheynes Beach 34°34'S, 118°45'E	F	Rested in the area for 3 weeks then returned to sea.
2	12/02/91	Fremantle 32°03'S, 115°45'E.	F	Several wounds. Released off Port Beach.
3	19/01/95	Tulki, Ningaloo Marine Park 22°02'S, 113°54'E	M	Hauled out at Tulki, west of Exmouth. No action required.
4	15/10/96	Wylie Bay 33°52'S, 121°53'E	F + pup	Live birth, pup died soon after birth. Lodged in WA Museum. (WAM #M48667)
5	12/11/96	Epineux Bay 26°20'S, 113°18'E	F + pup	Live birth, both animals went to sea.
6	23/12/96	Windy Harbour 34°50'S, 116°01'E	F	Good condition, went to sea soon after.
Crab-eater seal *Lobodon carcinophagus*				
1	17/07/82	Safety Bay 32°19'S, 115°44'E	F	Found alive, died in captivity.
2	7/01/93	Mandurah 32°32'S, 115°43'E	F	Good condition, taken by sea to a beach on the west side of Garden Island, found dead on 10/1/93.
3	3/02/93	Princess Royal Harbour 35°04'S, 117°53'E	?	Rested, then went to sea.
Subantarctic fur seal *Arctocephalus tropicalis*				
1	20/09/86	Kalbarri 27°43'S, 114°10'E	F	Found alive on beach. Kept at Atlantis, later transferred to Taronga Zoo.
2	1/09/87	Gordon Inlet 34°17'S, 119°28'E	M	Found alive on beach. Very underweight. Died 2/09/87, lodged at WA Museum. (WAM #M27189)
3	8/09/87	Point Anne 34°11'S, 119°35'E	F	Found dead on beach. Lodged at WA Museum. (WAM #M27192)
4	27/09/87	Two Rocks 31°30'S, 115°35'E	M	Found alive on beach. Underweight. Taken into care, released 7/12/90.
5	27/07/88	Sea Bird 31°16'S, 115°26'E	F	Found alive on beach. Underweight. Died 28/07/88.
6	12/09/88	Canal Rocks 33°41'S, 114°59'E	?	Found alive on beach. Underweight. Died on beach.
7	9/10/88	Yokinup Bay 33°52'S, 123°02'E	M	Found alive on beach. Underweight. Taken into care, released 7/12/90.
8	29/10/88	Nanarup Beach 35°00'S, 118°04'E	F	Found alive on beach. Underweight. Died 1/11/88.
9	10/01/89	Two Peoples Bay 34°57'S, 118°11'E	M	Found alive on beach. Underweight. Taken into care, released 7/12/90.
10	2/10/89	Cheynes Beach 34°34'S, 118°45'E	F	Found emaciated, dead.
11	5/10/89	Cottesloe 31°59'S, 115°45'E	?	Found dead.
12	12/11/90	Quaggi Beach 33°49'S, 121°10'E	?	Emaciated, died 13/11/90.
13	6/09/91	Eagle Bay 33°33'S, 115°04'E	F	Found alive. Euthanased.
14	14/08/92	Avalon Beach 32°34'S, 115°39'E	F	Found dead. Fishing net entanglement.
15	22/08/92	Frenchman's Bay, Albany 35°02'S, 117°53'E	M	Found emaciated, dead.
16	24/08/92	Frenchman's Bay, Albany 35°04'S, 117°53'E	?	Found emaciated, dead.
17	29/08/92	Preston Beach 32°54', 115°39'E	M	Blind in left eye, emaciated, severe pneumonia. Euthanased.
18	11/09/92	Peaceful Bay 35°02'S, 117°53'E	?	Found in emaciated condition 8/9/92. Euthanased. Fish bone in oesophagus.
19	19/09/92	Cottesloe 31°59'S, 115°45'E	M	Found emaciated, dead.
20	22/09/92	Albany 35°02'S, 117°53'E	?	Found dead.
21	7/10/92	Princess Royal Harbour 35°04'S, 117°53'E	F	Found emaciated, dead.

Appendix 1 (continued)

	Date	Sighting/Collection Site	Sex	History
22	9/11/92	Peaceful Bay 35°02'S, 117°53'E	M	Found alive in poor condition. Euthanased. Fish bone lodged in diaphram, roundworm infection.
23	14/12/92	Trigg Beach 31°52'S, 115°45'E	M	Transported to Augusta and released.
24	22/12/92	Princess Royal Harbour 35°04'S, 117°53'E	?	Found alive, emaciated. Euthanased.
25	24/01/93	Yanchep 31°33'S, 115°37'E	M	Picked up in a weak condition. Treated until 12/2/93, released off Augusta.
26	14/04/93	Green Pool, Denmark 34°57'S, 117°21'E	?	Engangled in fishing net, but found alive. Treated and released.
27	9/05/93	Esperance 33°51'S, 121°55'E	F	Found alive and emaciated, severe worm infection. Euthanased.
28	2/07/93	Hillarys Marina, Sorrento 31°50'S, 115°45'E	M	Poor condition, rehabilitated and released.
29	21/07/93	Wylie Bay 33°50'S, 122°00'E	M	Found alive, emaciated but died.
30	19/10/93	North West Cape, Jantz Access 21°47'S, 114°10'E	?	Resting on beach, returned to sea.
31	5/08/94	Injidup Beach 32°42'S, 114°59'E	F	Found alive, emaciated. Died later.
32	14/08/94	Swanbourne 31°58'S, 115°46'E	M	Emaciated and weak. Rehabilitated and released off Cape Leeuwin.
33	28/08/94	Preston Beach 32°54'S, 115°39'E	M	Emaciated and weak, died 29/08/94.
34	21/09/94	Two Rocks 31°30'S, 115°35'E	F	Rested then returned to sea.
35	22/09/94	Golden Bay 32°29'S, 115°45'E	F	Found emaciated, dead.
36	29/11/94	Geraldton 28°46'S, 114°37'E	?	Hauled out, poor condition. Rehabilitated then released.
37	21/07/95	Point Peron 32°16'S, 115°41'E	M	Hauled out, poor condition. Rehabilitated then released.
38	11/08/95	Green Head 30°04'S, 114°58'E	M	Emaciated and weak, died overnight.
39	15/08/95	Cervantes 30°30'S, 115°04'E	M	Emaciated and weak, died overnight.
40	8/10/95	Port Geographe, Busselton 33°39'S, 115°20'E	M	Weak and emaciated, rehabilitated and released off Hamelin Bay.
41	4/08/96	Mullaloo Beach 31°47'S, 115°44'E	M	Found weak and emaciated. Died in captivity.